ROYAL ASTRONOMICAL SOCIETY.

Vol. VI. *March* 8, 1844. No. 5.

Francis Baily, Esq., President, in the Chair.

The following communications were read:—

I. Observations of the Comet of Faye.

1. Observations made at Starfield. By W. Lassell, Esq.

These observations were communicated in letters, dated Feb. 6 and March 7; and the following is a tabular statement of them:—

Day.	Mean Solar Time.	Right Ascension of Comet.	Declination of Comet.	No. of Obs.	Stars of Comparison.
1844.	h m	h m s	° ′ ″		
Jan. 12	11 24	5 8 47·0	+3 36 35	2	23 Orionis and ✱ (*c*).
13	9 7	5 8 56·1	3 40 33	1	✱ (*c*).
15	8 30	5 9 25·6	3 49 30	1	✱ (*d*).
22	7 45	5 11 58·0	4 27 32	1	✱ (*e*).
25	8 34	5 13 27·6	4 46 2	1	8 Monocerotis.
Feb. 19	9 46	5 34 41·5	7 32 58	2	α Orionis.
22	8 52	5 38 2·3	+7 52 22	2	α Orionis.

The following information respecting the above observations, and those contained in the *Monthly Notice* for January last, has been furnished by the author.

They were made with a power of 96 on a micrometer eye-piece applied to the 9-feet Newtonian reflector. The micrometer has two stout parallel wires permanently fixed at right angles to the moveable and parallel spider's lines, their internal edges being about 8″ apart. One revolution of the micrometer is assumed to be = 18″·298. The interval of the transits of the comet and star over the thick wire was observed, the comet being so placed in the field that its nucleus should be concentric with the large zero-hole of the micrometer, and the distance in space between the zero and the star of comparison was measured with the micrometer. The comet has been throughout compared with one or other of the stars 23 *Orionis*, 30 *Orionis*, α *Orionis*, and 8 *Monocerotis*, either directly, or indirectly by means of intermediate telescopic stars.

In all cases, the author has communicated the intervals in time and the distance in N. P. D. in revolutions of the micrometer between the comet and the stars of comparison. The assumed places of the above-mentioned stars are as follows:—

23 Orionis	1843 Dec. 12	R.A.	$= 5^h\ 14^m\ 40^s{\cdot}3$
		Decl.	$= +3^\circ\ 23'\ 22''{\cdot}4$
30 Orionis	Dec. 22	R.A.	$= 5^h\ 18^m\ 42^s{\cdot}0$
		Decl.	$= +2^\circ\ 57'\ 20''{\cdot}2$
8 Monocerotis	1844 Jan. 25	R.A.	$= 6^h\ 15^m\ 32^s{\cdot}4$
		Decl.	$= +4^\circ\ 40'\ 3''{\cdot}7$

The place of *α Orionis* is taken from the *Nautical Almanac*. In some instances, the distance in declination between the comet and one of the above-mentioned stars was measured intermediately by two and sometimes by three telescopic stars. The observations are not corrected for the effects of refraction and parallax.

2. Right Ascensions and North Polar Distances of the Comet of Faye, from Observations at the Royal Observatory, Greenwich. Communicated by G. B. Airy, Esq. Astronomer-Royal.

Day of Observation.	Mean Solar Time for R. A.	True Right Ascension of Comet.	No. of Obs. in R. A.	Mean Solar Time for N.P.D.	True N.P.D. of Comet.	No. of Obs. in N.P.D.	Remarks.
1843.	h m s	h m s		h m s	° ′ ″		
Nov. 29	12 30 46	5 21 36·05	14	12 38 40	84 25 36·0	11	
	.....	.....	...	12 48 37	84 25 32·1	1	Meridian Observation with the mural circle.
	17 33 9	5 21 28·19	6	17 33 9	84 28 9·9	6	
Dec. 11	9 1 7	5 15 59·50	7	9 1 7	86 8 25·2	7	
1844. 15	14 4 37	5 13 58·87	7	14 28 14	86 31 40·1	1	
Jan. 15	9 55 30	5 9 24·43	2	9 54 10	86 9(32·6)	1	
22	8 17 27	5 11 55·62	6	8 16 29	85 33 5·1	5	
26	11 29 0	5 14 (4·00)	2	11 29 0	85 7(19·0)	2	
Feb. 8	8 11 30	5 23 39·71	1	8 11 30	83 42 24·7	1	Meridian Observation with transit instrument and mural circle.
19	11 46 9	5 34 45·58	2	11 46 9	82 26 38·9	2	
20	8 41 32	5 35 46·15	6	8 44 20	82 20 26·8	5	
22	8 18 13	5 38 2·19	10	8 12 26	82 8 1·1	6	

The above observations, with the exceptions mentioned in the remarks, were made with the south and the east equatoreals of the Observatory, the observations of Nov. 29 and Dec. 11 being made with the latter and all the rest with the former instrument. In general, the observations consisted of comparisons, in the same position of the polar axis of the instrument, of the comet with neighbouring stars in both elements, the differences of right ascension of the star of comparison and the comet being determined by the time of their transits across the declination-wire, and the differ-

ence of north polar distances by the reading of the declination circle of the east equatoreal, and of the sector-arc of the south equatoreal. The only exceptions to this rule are the results of Jan. 15 and Jan. 26, 1844 (included in brackets), which depend on the readings of the hour-circle and declination-circle of the south equatoreal, and which may be affected with errors of 3^s or 4^s in right ascension, and of $1'$ in north polar distance.

The results have been rigorously cleared of the effects of refraction and parallax, the distances of the comet from the earth being taken from an ephemeris, by Professor Henderson, in the *Monthly Notice* of this Society for January last, as far as it extends.

The places of the stars of comparison have been taken either from the Catalogue of Santini, contained in Vol. XII. of the *Memoirs* of this Society, or from meridian observations made since at the Royal Observatory. The only element which is at all doubtful is the right ascension of the star of comparison for the observations of Feb. 20, which has been deduced from the time of its transit across the central wire of the telescope of the mural circle. It is believed that this determination is not in error to the amount of 1^s, and the result may be used without scruple at this stage of the correction of the orbit. On Feb. 19, 20, and 22, the comet was excessively faint, and it required a great deal of caution to observe it. The single results are, however, for those evenings, on the whole very consistent, the north polar distances observed on Feb. 22 being subject to greater uncertainty than the rest. It was extremely difficult to bring the comet to the equatoreal wire of the instrument on that evening, though the times of transit on the same evening were observed with tolerable accuracy.

3. Right Ascensions and Declinations of the Comet of Faye, observed with the Equatoreal at the Observatory of Trinity College, Dublin, 1844. By Mr. Charles Thompson, Assistant. Communicated by Sir W. Hamilton.

Day.	Sidereal Time.	Right Ascension.	Declination.
1844.	h m s	h m s	° ′
Jan. 10	4 3 46	5 8 33·0	+3 25·8
12	4 4 12	5 8 50·0	3 36·1
13	4 15 49	5 8 55·9	3 41·0
14	5 46 0	5 9 8·4	3 47·3
15	4 15 3	5 9 26·6	3 50·4
18	5 2 20	5 10 18·4	4 5·5
22	6 13 22	5 12 1·6	4 27·4
23	6 10 19	5 12 25·2	4 34·9
24	5 55 49	5 12 54·3	4 40·8
25	6 1 51	5 13 27·6	+4 46·6

4. Observations of the Comet of Faye. By C. Rumker, Esq. Communicated by Dr. Lee.

Day.	Mean Time at Hamburg.	App. Right Asc. of the Comet.	App. N. Dec. of the Comet.	Number of Observations and Remarks.
1843.	h m s	° ′ ″	° ′ ″	
Dec. 1	10 33 46·0	80 11 55·78	5 14 44·4	14
1	12 39 53·3	.....	5 13 52·2	Merid. Circle.
9	10 41 9·4	79 14 42·9	4 4 39·1	10
9	12 4 46·2	.....	4 4 30·6	Merid. Circle.
10*	9 52 15·2	79 7 18·7	3 58 8·2	22
11	9 51 5·1	79 0 7·7	3 51 37·2	17
13	8 30 46·5	78 45 45·1	3 39 56·7	12
15	11 45 26·0	78 30 22·4	3 29 11·2	11
15	12 17 58·0	.....	3 28 40·8	Merid. Circle.
16	8 23 31·7	78 24 44·3	3 25 0·7	1: doubtful.
1844. 17	8 4 49·6	78 18 3·7	3 20 42·1	17
Jan. 21	8 8 0·4	77 52 12·9	4 20 55·1	2
21	10 10 4·2	.....	4 12 26·9	Merid. Circle.
22	9 45 31·6	77 59 21·5	4 28 1·3	18
23*	9 58 8·4	78 6 39·7	4 33 58·1	14
26	8 18 15·5	78 30 11·1	4 52 7·2	3

5. Observations of the Comet of Faye made at the Observatory, Durham; Lat. North 54° 46′ 6″; Long. West 6^m 18^s. Communicated by the Rev. Temple Chevallier.

The equatoreal telescope employed is by Fraunhofer, of 6·375 inches aperture and of about 9 feet focal length. The magnifying power was 65; and, as the comet would generally bear no illumination, the observations were made with a double ring micrometer.

As a perfect observation of this kind gives eight instants of contact of the comet with the outer and inner circumferences of the rings, and as many for a star which crosses the same field, it determines their difference of right ascension with considerable accuracy. But it does not generally give the means of ascertaining their difference of declination with the same precision. Hence the right ascensions are more accurate than the declinations.

The comet was observed four times on the meridian with a transit instrument. The telescope has an aperture of 3·2 inches, and is of about 4 feet focal length; a power of 60 being employed. It has upon its axis a circle of 2 feet diameter, furnished with two microscopes.

* The observations marked with an asterisk are believed to be the best. The meridian observations are, owing to the necessity of partly illuminating the field, not so much to be relied on.

As the comet would bear no illumination upon the meridian, its declination could be obtained only by estimating when it was in the middle of the field, and its right ascension by observing the time when it quitted the field of view. Both determinations were consequently only approximate.

When it was possible, the comet was referred to a star which crossed the same field. At other times, it was referred to a known star near to it.

The following is a synopsis of the observations :—

Day.	Greenwich Mean Solar Time.	Right Ascen. of Comet.	Declination of Comet.	No. of Obs.	Stars of Comparison.	Remarks.
1843.	h m	h m s	° ′ ″			
Dec. 1	9 40	5 20 47·44	+5 16 30	3	.....	Uncertain.
2	9 6	20 22·07	5 6 10	2	Anonymous	
4	10 51	.....	4 39 22	1	.....	Very uncertain.
11	9 12	15 56·06	3 50 43	4	γ Orionis	
12	10 6	15 25·20	.....	2	.....	
13	8 26	15 0·90	3 42 51	5	.....	
15	11 33	14 0·35	3 30 25	6	23 Orionis	
21	9 6	11 27·40	3 6 16	3	Ditto	
24	8 30	10 28·00	3 1 0	1	.....	
26	7 48	9 50·10	3 0 56	4	ϱ Orionis λ Orionis	
27	9 58	9 33·30	3 3 1	4	ϱ Orionis	
1844. Jan. 18	9 37	10 34·70	4 17 38	2	Ditto	Only approximate.
23	9 38	12 32·30	4 33 49	3	Ditto	
24	11 55	12 59·10	+4 41 24	2	Ditto	

All the declinations are subject to some uncertainty. On Dec. 2, the comparison-star was observed on the meridian, and its right ascension was found to be $5^h\ 23^m\ 28^s{\cdot}94$, and its declination $+5^\circ\ 11'\ 5''{\cdot}21$.

6. Observations made at Hartwell, Bucks. By the Rev. J. B. Reade. Communicated by Dr. Lee.

II. Elements of the Comet of Faye. By Professor Henderson.

From observations made at Cambridge on December 16 and January 15, and at Greenwich on February 8, the following elements of the comet's orbit have been obtained, which are likely to be more correct than those formerly given :

		° ′ ″
Epoch of Mean Anomaly for December 31, 1843, Mean Noon at Greenwich		11 32 14
Longitude of Perihelion		43 39 46
Eccentricity	sin.	34 0 38

Log. of Semi-axis Major 0·56533
Mean Daily Motion ..... 503″·52

Time of Revolution ..... 7·0468 sidereal years.

Longitude of ascending Node ..... 211° 59′ 12″
Inclination 11 28 48

Motion direct.

Ephemeris for 8^h *Mean Greenwich Time.*

Day.	Right Ascension.	Declination.	Distance from Sun.	Distance from Earth.
1844.	h m s	° ′		
Feb. 8	5 23 36	+6 18	2·008	1·325
12	5 27 32	6 45	2·029	1·380
16	5 31 36	7 11	2·051	1·437
20	5 35 52	7 37	2·073	1·495
24	5 40 20	8 2	2·096	1·555
28	5 45 4	+8 27	2·118	1·616

T. HENDERSON.

Edinburgh, Feb. 14, 1844.

III. Elements of the Comet of Faye. By J. R. Hind, Esq. Communicated by the Rev. R. Main.

The following elliptical elements were computed from the Paris observation on Nov. 24, an observation at Hamburg on December 17, and one at Kensington on January 15. The corrections for parallax and aberration were applied according to the method described by Gauss in the *Theoria Motûs Corporum Cœlestium.* The longitudes were reduced to the mean equinox on the 1st January, 1844. The data employed in the calculations stand as follows:—

Greenwich Mean Time.	Comet's Geocentric Longitude.	Comet's Geocentric Latitude.	Earth's Heliocentric Longitude (corrected).	Log. Rad. Vect. of Earth (corrected).
1843.	° ′ ″	° ′ ″	° ′ ″	
Nov. 24·7051100	80 29 39·8	−16 38 54·8	62 19 15·1	9·9942268
Dec. 17·3089757	77 34 51·4	19 36 39·5	85 16 14·0	9·9929530
1844.				
Jan. 15·5521604	76 36 59·6	−19 1 16·5	115 4 10·1	9·9929275

Hence the following elliptical elements:—

Epoch 1844, January 1^d·0 Greenwich Mean Time.

Mean Anomaly ..... 9° 56′ 36″·67
Longitude of Perihelion on the Orbit ..... 53 19 52·4 } From the
Longitude of Ascending Node..... 208 24 18·3 } Mean Equinox.
Inclination ..... 11 7 8·7
Angle of Eccentricity ..... 31 54 52·15

Log. of Semi-axis Major ..... 0·5582124

Mean Daily Sidereal Motion..... 516″·04548

Period of Sidereal Revolution ..... 2511^{d}·403 or about 6 years 11 months.

Log. of Semi-axis Minor ..... 0·4870372
Log. of Semi-parameter ..... 0·4158620
Log. of Perihelion Distance ..... 0·2315531
Log. of Eccentricity in Seconds..... 5·0375958

Log. $\sqrt{a(1+e)}$..... 0·3712607
Log. $\sqrt{a(1-e)}$..... 0·1157766

IV. Letter from Professor Encke (translated), dated Berlin, Feb. 19, 1844. Communicated by G. B. Airy, Esq. Astronomer-Royal.

" The comparison of the Berlin observations of the *Comet of Pons*, made in the year 1842, with the elements which were derived from the observations up to the year 1838 and from the mass of *Mercury* thence deduced, and with the total disturbances up to 1842, has shewn, that the remaining errors are quite insignificant; and I find, in fact, for the less accurate observations at the commencement, when the comet was very faint: —

	$\Delta\alpha$	$\Delta\delta$
Feb. 9	— 1″·7	+ 18″·2
11	+ 17·9	— 1·3
12	+ 16·9	+ 4·7
March 3	— 1·6	— 4·6

And for the later and more accurate observations:—

March 11	+ 4″·8	+ 3″·6
20	+ 3·7	— 5·3
23	+ 9·3	— 8·3
24	+ 0·5	+ 2·2
April 6	+ 7·5	— 4·2
7	+ 1·0	+ 3·4

both sets of errors in right ascension and in declination being expressed in seconds of space. Now that I am preparing the *Ephemeris* for 1845, it would be highly important for me to compare the whole of the observations of 1842, especially those of the Cape of Good Hope. Up to the present time, I have received no communication concerning them. Should the results of these observations be known to you, I should be much obliged if you would do me the favour to communicate them.

" The present remarkable comet we have seen up to the 13th of February, but we shall probably be able to follow it still farther.

" The last observations were,

		R.A.	Declination.
	h m s	° ′ ″	° ′ ″
Feb. 7	7 15 34	80 39 57·8	+ 6 10 51·9
10	10 59 8	81 22 21·5	6 31 54·9
13	7 40 6	82 3 54·6	+ 6 51 42·8

V. Occultations of Fixed Stars by the Moon, observed at Hamburg. By C. Rumker, Esq. Communicated by Dr. Lee.

Day.	Star's Name.	Phenom.	Observed Mean Solar Time at Hamburg.
1843.			h m s
May 9	e Leonis.....	Imm.	9 34 56·3
		Em.	10 21 27·9
Aug. 12	9 Piscium	Imm.	10 43 54·2
		Em.	11 12 15·2
	$\varkappa$ Piscium	Em.	11 33 6·1
17	τ Arietis.....	Em.	12 28 2·3
Nov. 11	ζ Geminorum...	Imm.	13 11 9·6
		Em.	14 13 46·9
1844.			
Jan. 23	9 Piscium	Imm.	6 55 46·8
		Em.	7 22 11·3
Jan. 29	τ^2 Arietis.....	Imm.	5 58 45·5

VI. Farther Remarks on the Revision of the Southern Constellations. By Sir J. F. W. Herschel, Bart.

The idea, originally proposed of entirely re-modelling the southern constellations, has (after very mature consideration and much discussion, and after consulting the opinions of some of the most eminent continental astronomers, which have been found very adverse to the idea of so decided a change) been laid aside; at least in so far as regards the new catalogue of stars, now printing under the authority of the British Association. It is conceived, however, that if the nomenclature of the constellations, generally, be ever destined to undergo a systematic change at all (and many reasons may be adduced for considering such a change desirable) the first and most important step towards it will be found in the work above alluded to, and in the catalogues, now publishing simultaneously with it on the same system of nomenclature, which clear the ground of all existing confusion; and, by assembling into one distinct view, and under names and numbers at least definite and recognised, all the individuals of which the new groups must be composed, it will be easy at any future time to pass, by a single table of synonyms and by one decided step, from one to the other system, whenever the convenience and consent of astronomers may dictate the propriety of a change. Such views, if entertained, would render the nomenclature of the present catalogues so far provisional that a more rational and convenient system of groups (confined not to the southern hemisphere, but extending over both) may yet be contemplated by astronomers. Nevertheless, so long as the ancient system is at all retained, a general and scrupulous adherence to the nomenclature here adopted is most earnestly recommended to the astronomical world, as the only mode of escape

from a state of confusion at present quite intolerable. As regards the southern constellations, the following are the principles proposed; viz.

1°. That all the constellations adopted by Lacaille be retained, and his arrangement of the stars preserved; subject, however, to certain alterations hereafter specified.

2°. That all the stars, having a doubtful location, such as those which Lacaille (after the manner of Ptolemy) has considered as ἀμορφωτοι (unformed), be included within the boundaries of either one or other of the contiguous constellations, so as to preserve a regularity of outline and nomenclature.

3°. That all the rest of Lacaille's stars be placed within the boundaries laid down by him, with the following exceptions:—First, A few stars which are located too far from the border of the constellations in which they are registered, to admit of an uniform contour of the lines. Secondly, Such stars as have been previously observed by Ptolemy or Flamsteed, and by them located in other constellations, or which interlace and are confusedly mixed with such previously observed stars.* Thirdly, The four stars that are placed by Lacaille in the end of the *Spear of Indus*, but which are now assumed to form part of the constellation *Pavo*, in order to render the contour of these two constellations less circuitous.

4°. That the letters, selected by Lacaille, be adopted in preference to those introduced by Bayer in *Argo*, *Centaurus*, *Ara*, and *Lupus*. That the Greek letters (with a few exceptions) be retained only as far as stars of the 5th magnitude inclusive. That no Roman letters be at present used, except in the subdivisions of *Argo*, subsequently mentioned.

5°. That *Argo* be divided into four separate constellations, as partly contemplated by Lacaille; retaining his designations of *Carina*, *Puppis*, and *Vela*; and substituting the term *Malus* for *Pixis Nautica*, since it contains four of Ptolemy's stars that are placed by him in the *mast* of the ship.

6°. That the original constellation *Argo*, on account of its great magnitude and the subdivisions here proposed, be carefully revised in respect of lettering, in the following manner:—First, In order to preserve the present nomenclature of the principal stars, all the stars in *Argo* (that is, in the general constellation, regarded as including the subdivisions above-mentioned) indicated by Greek letters, by Lacaille, to be retained, with their present lettering, under the general name *Argo*. Secondly, All the remaining stars, to be

* A single exception to this rule occurs in the case of the last star in the constellation *Piscis Australis*, in Ptolemy's catalogue, which Bayer has denoted by the letter *κ*, and which is presumed to be the same as that which has been designated by Lacaille as *γ Gruis*. As there is some ambiguity, however, in the position of this star in Bayer's map, it is assumed (like some other stars already mentioned) as common to both constellations, in order to adjust this discordance; and, in the catalogue above-mentioned, Lacaille's designation of *γ Gruis* is retained, on account of its forming the principal object in the head of that constellation.

designated by that portion of the ship in which they occur, such as *Carina*, *Puppis*, *Vela*, and *Malus*, and to be indicated by the Roman letters adopted by Lacaille, as far as the fifth magnitude inclusive. And no two stars, far distant from each other in the same subdivision, to be indicated by the same letter; but, in cases of conflict, the greater magnitude is to be preferred; and, when they are equal, the preceding star to be fixed upon.

7°. That the constellations, which Lacaille has designated by *two* words, be expressed by only *one* of such words. Thus, it is proposed that the several constellations indicated by Lacaille as *Apparatus Sculptoris*, *Mons Mensæ*, *Cælum Scalptorium*, *Equuleus Pictorius*, *Piscis Volans*, and *Antlia Pneumatica*, be called by the respective titles of *Sculptor*, *Mensa*, *Cælum*, *Pictor*, *Volans*, and *Antlia;* contractions which have on some occasions been partially used by Lacaille himself, and are very convenient in a registry of stars.

VII. Extract (translated) from a Letter of Professor Bessel to Sir J. F. W. Herschel, Bart. dated Königsberg, January 22, 1844. Communicated by Sir John Herschel.

"I think it may be interesting to you, or to one or other of your astronomical friends who occupy themselves with meridional instruments, to be made acquainted with a result which I have obtained from a theoretical investigation, the object of which was to determine the effect of gravity upon the figure, and consequently on the divisions, of a circle fixed in the vertical plane. The effect will manifestly be, that the radii in the upper part of the circle will be shortened; those in the lower part lengthened; and all, with the exception of the vertical ones, bent downwards. These changes, the magnitude and law of which must depend on the special construction of each circle, in two instances known to me (namely, those of two meridian instruments by Repsold, each of which is furnished with two circles, at opposite ends of the axis, each being read by four microscopes), have become prominently sensible; giving rise to this effect, namely, that on turning the instrument through 180°, a different measure is given by its two circles. From this result it follows that the supposition of the amount of change being insensible, or of the influence of gravity on the circle being eliminated by the four readings, is without foundation; and that there is, therefore, cause for apprehending in general that every circle gives an erroneous measure of the zenith-distances, and erroneous to an extent which, in respect of the existing means of pointing its telescope in a given direction, and reading the divisions, is by no means insensible.

"Now, as it is necessary to be able to determine this influence to such a degree of approximation as to be in a situation to judge whether it is possible to adopt any mode of using the instrument by which the results shall be freed from it, I have been led to undertake the solution of the following statical problem:—'To

determine the figure of equilibrium of a circle placed in the vertical plane.' This problem is manifestly considerably complicated. For a circle, having m radii, and each pair connected together, not only by the circular rim, but also by a direct connexion, there is (in respect of both circles) an aggregate of $4m$ elastic lines, both expansible and flexible, for the determination of which $3 \times 4m = 12m$ constants are necessary; besides which, $6m$ unknown quantities also come into consideration; namely, the co-ordinates of each of the particular points in which two or more of the lines are united, and the directions of the lines with respect to the same; consequently, three unknown quantities for each of the $2m$ particular points. The problem, therefore, includes $18m$ unknown quantities; and, in the case of Repsold's circles, which have 10 radii, 180. The equations necessary for their determination will be obtained from the condition that the sum of the forces which act not only upon the particular points, but also upon every point of a line, arising from gravity and the connexion of the different parts, shall be in equilibrium.

"The general solution of this problem, which is limited neither by the assumption of a symmetry of figure, mass, or elasticity, nor by that of the absence of primitive tension between the different parts of the whole, may be reduced, as I find, to the solution of $3m$ linear equations, and, on the supposition of symmetry, to three such equations. But this last supposition very probably corresponds to no actual case. It is also probable that in no case can we obtain a knowledge of the deviations from actual symmetry, which it is necessary to possess, in order to obtain a result which shall give the required influence in numbers. I find the following general proposition respecting the law of this influence, which is restricted by no particular supposition.

"If the angle between the initial radius of the circle and the vertical be denoted by u, the angle between the same radius and a point of the division by v, then the variation of this angle arising from gravity, in the vertical plane of the circle, is expressed by $fv.\cos u + f'v.\sin u$, where fv, $f'v$, are functions of v, independent of the position of the initial radius, and dependent only on the construction of the circle.

"This proposition is of considerable importance for practical astronomy. We readily infer from it, that the influence of gravity upon a zenith distance entirely vanishes when the latter is determined by the mean of four observations, namely, observations of the object itself and of its image reflected from a horizontal mirror, repeated in reversed positions of the axis of the instrument. From the same proposition we also easily deduce the mode of arranging the observations through which the errors of division must be determined, in order that their results may be also independent of the influence of gravity.

"It follows also from this that the astronomer who uses a circle is in possession of the means of rendering his results entirely independent of the influence of gravity; and that results obtained by

different instruments, when this method is followed, must accurately agree. It is likewise to be remarked, that the power of reversing the axis is an advantage with which the independence of the zenith distances of the influence of gravity is connected (and without which such independence could not be obtained).

"Although of no use in a practical point of view, it may not be uninteresting to investigate the numerical result which the theory now developed gives in a particular case, on the supposition of symmetry. For this purpose, I took the case which corresponds to the dimensions of my 3-feet circle by Repsold, and found that one of its radii, the direction of which corresponds to a zenith distance z, alters in length about $-0''{\cdot}2274 \cos z$: its extremity deviates from its direction at the initial point about $+0''{\cdot}6726 \sin z$; and its direction at the extremity of the arc from that at the initial point by $-0''{\cdot}5124 \sin z$. Although the supposition of symmetry upon which these results depend is probably only correct in respect of the exterior figure of certain parts of the whole instrument, this calculation may give an idea of the extent to which the influence of gravity will attain; an extent which, from the complicated nature of the problem, we should not be able, without a calculation, to estimate.

"You may easily suppose that the conclusion I have just obtained, namely, that the attainment of any required degree of precision in results depends only on the observer, appears to me to be the strongest motive for the zealous prosecution of observations. In the ever-memorable days I passed with you at Collingwood, you expressed the opinion, that the prospect of completely attaining the object of any undertaking is of itself sufficient to render it in a high degree attractive."

VIII. A Letter from J. R. Crowe, Esq., British Consul-General of Norway, concerning a Literary Society established at Alten, near Hammerfest. Communicated (with a letter) by Dr. Lee.

Mr. Crowe visited England in the summer of 1843, and gave information concerning the existence of a Society consisting of Swedes, Englishmen, and Germans, at Alten, near Hammerfest, in Finmark, under the patronage of a Swedish clergyman, the pastor of that district. This Society was in possession of some instruments which had been left there by some French gentlemen of science who were sent to Lapland by Louis Philippe a few years ago. Regular observations of the barometer and thermometer had been instituted according to the plan suggested by Sir John Herschel, and Mr. Crowe was of opinion that if an observatory could be established the Society would cheerfully undertake the working of it.

Dr. Lee munificently furnished the Society with an achromatic transit instrument of 30 inches focal length, and an aperture of 2 inches, on an iron stand, and with a circle 6 inches in diameter, reading to 1′, and with a collection of books on various depart-

ments of science: an astronomical clock was also ordered of Mr. Dent, but it was not ready to be sent by the same vessel which conveyed the instruments. Owing to the exertions of Dr. Lee, other fellows of this Society were induced to contribute books, and the nucleus of a good library was thus formed. Mr. Crowe took with him from England two minimum thermometers with the intention of placing one on the top of Storvandsfield, the highest mountain in the neighbourhood of Alten, and the other on the highest point of the southern extremity of Spitzbergen; but he arrived too late to carry the latter part of his plan into effect. The difficulties of the ascent of Storvandsfield are thus described by Mr. Crowe :—

"The ascent to Storvandsfield was very difficult; so much fresh snow had fallen as to impede even the snow-shoes, which the party were obliged to use. The task, however, was accomplished, and the thermometer safely fixed on the highest point. It was just in time, as one of those sudden gales of wind sprang up, peculiar to high mountain regions, driving and whirling the snow before. For hours the party were exposed to considerable danger, and by the time it did lull, Mr. Greive, who had volunteered to superintend the task, was so knocked up, as to be unable to proceed, and the guides had to carry him; fortunately, a shelter of loose stones, erected by the nomadian Laplanders, was reached, where they deposited him, while one of the guides descended for further assistance. Happily, the cold was not intense, so that a warm bed and rest perfectly recovered him."

Alten is in north latitude 69° 38′, and in longitude 23° 43′ east, and thus by its geographical situation, highly important for certain classes of observations, being the most northern place in the world at which an observatory is established. The following observations have been uninterruptedly carried on, viz. :—

Of the barometer; the thermometer (with the maximum and minimum temperatures; the pluviometer; the galvanometer; declination magnetometer; land winds and approximate force; of clouds, their direction, approximate velocity, and general description; and of the Aurora Borealis.

Erratum in the Monthly Notice for February last.

The Council take the earliest opportunity to correct a misstatement in their Report to the General Meeting of February last, concerning the Reduction of the Ancient Greenwich Lunar Observations at the Royal Observatory. It is stated at page 44, that "the work has been at length brought to a close." This is not the case, but it is in a state of great forwardness; the tabular places have been computed throughout, and the labour of an additional year will probably complete the reduction of the observations.

London :—Printed by Moyes and Barclay, Castle Street, Leicester Square.